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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.        | CONFIRMATION NO.       |
|--|-------------|----------------------|----------------------------|------------------------|
| 10/624,260   | 07/22/2003  | Foot Shen Wong       | 02-0146                    | 7340                   |
| 41066 7590 12/03/2007<br>MURABITO, HAO & BARNES, LLP<br>TWO NORTH MARKET STREET, THIRD FLOOR<br>SAN JOSE, CA 95113 |             |                      | EXAMINER<br>PARRIES, DRU M |                        |
|  |             |                      | ART UNIT<br>2836           | PAPER NUMBER           |
|  |             |                      | MAIL DATE<br>12/03/2007    | DELIVERY MODE<br>PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                    |  |
|------------------------------|--------------------------------------|------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/624,260 | <b>Applicant(s)</b><br>WONG ET AL. |  |
|                              | <b>Examiner</b><br>Dru M. Parries    | <b>Art Unit</b><br>2836            |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 November 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/07</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Applicant's arguments with respect to claims 1, 4, 7, and 11 have been considered but are moot in view of the new ground(s) of rejection.

#### *Claim Objections*

2. Claim 19 is objected to because of the following informalities: the Examiner believes the phrase "crossover point" was meant to be "switchover point". The phrase "crossover point" was never mentioned before in any claim. Appropriate correction is required.

#### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-8 and 10-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carobolante (6,084,378), Alfrey (2003/0103364), and Gay (6,791,390). Carobolante teaches a current source ( $V_M$ ) and four power switches forming an H-bridge circuit selectively coupled to supply current to a load. He also teaches a plurality of power switch driving circuits (not shown) to control the conduction state of the power switches to selectively couple at least two power switches to a PWM signal. Carobolante teaches two modes of operation: a linear mode for periods of low current consumption and a PWM mode for periods of higher current consumption. Also, the current associated with the PWM signal is zero during the time, just before switchover, while the linear current is being supplied. He also teaches the idea of adding additional circuitry to drive the load with linear current from the current source. Carobolante

also teaches that the condition under which a PWM current or a linear current is used to power the load is a matter of design choice for one skilled in the art. Therefore, it is taught that any desired type of output condition (i.e. a specified ripple current), which is known to one of ordinary skill in the art, can be controlled and implemented by the linear current source and PWM signal of Carobolante's invention. (Col. 1, lines 30-31; Col. 2, lines 17-23, 29-31; Col. 3, lines 40-46; Col. 14, lines 18-20, 22-29; Fig. 1). Carobolante fails to explicitly teach the desired output producing a specified ripple current, a system having two current sources, the load being a thermal electrical cooler, what the direction of current through the load defines, and a controller. Alfrey teaches a linear H-Bridge circuit with for supplying current to a load, such as a thermoelectric cooler. He also teaches the direction of current through the load to define a cooling or heating mode. He also teaches the circuit comprising two current sources (Fig. 7, 7A; 17 & 19) with current source switches (601), wherein one source is coupled to the load during a first period and the other is coupled during a second period via current source switches ([0005] & [0044]). He also teaches a controller (21) to control switch driving circuits and the current source switch, wherein the controller comprises an input (22) representing the current to be flowing to the load. (Fig. 3A; [0033]) It would have been obvious to one of ordinary skill in the art at the time of the invention to implement a thermoelectric cooler as the load and define the direction of current as either a cooling or heating mode because some applications of an H-Bridge circuit are used specifically for thermoelectric coolers and the heating and cooling modes are necessary for the cooler to function properly (inherent). It also would have been obvious to one of ordinary skill in the art at the time of the invention to implement two current sources in the circuit to control the magnitude of the current being supplied to the load. It would have been

obvious to one of ordinary skill in the art at the time of the invention to add Alfrey's controller to Carobolante's invention since Carobolante didn't explicitly state how his switch driving circuits were being controlled. Also, with the modifications of Alfrey into Carobolante's invention, the input (22) to the controller represents the switchover point based on the current to be supplied and that determines whether Carobolante's system will use the linear mode (low current) or the PWM mode (high current). Gay teaches a power distribution system including a semiconductor device that is formed to function as a voltage regulator (Abstract). He goes on to teach the voltage regulator operating over a wide range of load currents and operable to minimize ripple current in the output voltage (Col. 2, lines 32-42). Therefore, Gay teaches a system where a specific ripple current is achieved at all times (i.e. less than X amps; where X is greater than zero). It would have been obvious to one of ordinary skill in the art at the time of the invention to control the system of Carobolante to always produce an output voltage with a specified ripple current (less than X amps) to the load to minimize the possibility of malfunction and to provide a more precise output voltage.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Carobolante (6,084,378) and Alfrey (2003/0103364) as applied to claim 7 above, and further in view of Walter (2003/0155813). Carobolante and Alfrey teach an H-Bridge circuit as described above. The two references fail to teach a filter circuit coupled between some switches and the load. Walter teaches a filter circuit (34, 36) coupled between two of four switches and the load (Fig. 1; [0034]). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a filter circuit for attenuating harmonic distortion in the output voltage.

***Conclusion***

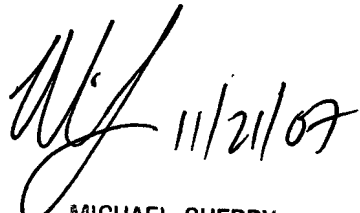
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dru M. Parries whose telephone number is (571) 272-8542. The examiner can normally be reached on Monday -Thursday from 9:00am to 6:00pm. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry, can be reached on 571-272-2800 x 36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DMP

11-19-2007

  
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